Space Nutrition

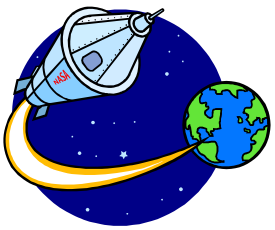
Volume 1 | The Research Method | Issue #3

Bone Food Facts

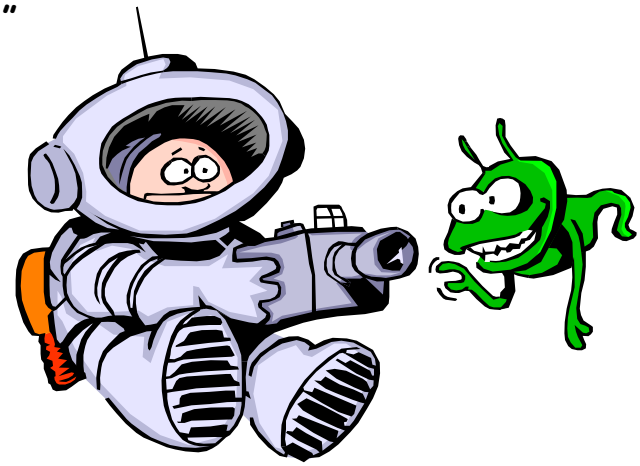
Getting enough calcium and Vitamin D will help build strong bones on Earth and keep bones healthy on orbit. However, taking extra amounts of these nutrients alone does not fix the bone loss of space flight. Exercise is also important for bone health everywhere in the universe.

Space Facts

We see gravity in action when objects fall to the ground. During space flight, gravity is greatly reduced because the space shuttle is in a state of continuous free-fall around the Earth. This condition is called microgravity or 'weightlessness.'



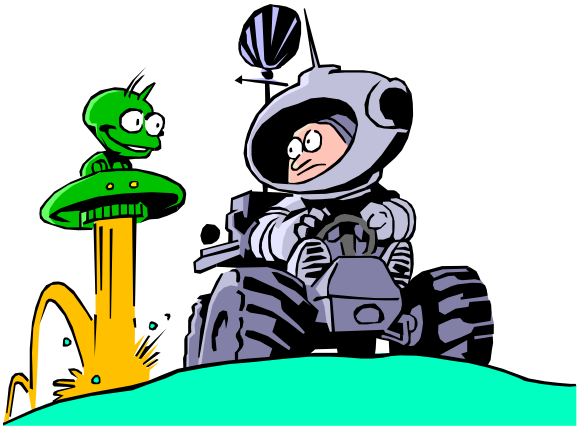
The scientific method is used to conduct research both on Earth and on orbit. It consists of 5 steps: 1) asking a question, 2) making observations, 3) forming a hypothesis, 4) collecting data and 5) drawing conclusions. Before an experiment can be 'flown' on a shuttle, scientists from NASA and universities across the nation must complete steps 1-3. We wrote a research proposal asking two questions: How does the movement of calcium through the body change in weightlessness? Is the movement different after being in space for 1-2 weeks, than after 4-6 months? This proposal became experiment E381 - "Calcium Kinetics During Space Flight."



In the proposal, we first made observations by reading scientific journals to understand what is already known about bone, calcium, and microgravity. Much of this information came from earlier studies on Skylab and the Mir space station. We then made hypotheses by predicting what might happen to bones and calcium during space flight, and included these predictions in the research proposal. Once the proposal was approved, we began defining detailed requirements, developing hardware, and training the astronauts. This will prepare us for the next step in the scientific method – collecting data. Data collection for E381 begins about 90 days before launch, and is planned for late March, 2002.

Did you know?

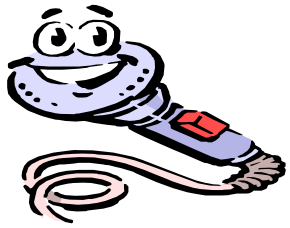
- Research studies must be reviewed by other scientists before planning starts to fly them in space.
- Experts review these studies to determine if there any risks to the astronauts participating in the procedures, and take steps to reduce the risks.
- Because of the special characteristics of microgravity, the way an experiment is done must often be changed before it can be flown on the shuttle.
- It usually takes 2-5 years before a study that has been approved actually flies on the space shuttle.



Word of the Month

Centrifuge

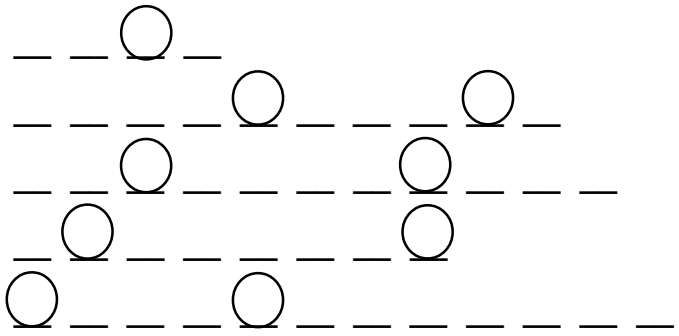
Can you guess what this word means? Look for the meaning of the "Word of the Month" in the next issue of Space Nutrition.



FUN CORNER

Find the Smart Science Word

Fill in the blanks using the 5 steps of the Scientific Method. Then rearrange the circled letters to find the Smart Science Word.



Do you know the Smart Science Word?

_____ _____ _____ _____ _____ _____ _____ _____ _____

Solution to Last Month's Crossword

C	H	E	E	S	E							D
				H				E				A
		S		U	G	R	A	V	I	T		Y
	S	P	I	T				A				
		A		T		M				R		
T		C	A	L	C	I	U	M		I		
E		E	T	E		N		I		C		
E			L		H	E	A	L	T	H		Y
N	A	S	A			R		K				O
	G		N		L	A	B					G
M	E	A	T			L	O	N	G			U
A			I			S	N		R			R
R			S	T	S		E		E	A		T
S	U	N			M				E			
			P	R	O	T	E	I	N			

For more information, log on to the Nutritional Biochemistry Laboratory's website at
www.jsc.nasa.gov/sa/sd/facility/nutrition.htm